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ABSTRACT

This project was undertaken to assist South Texas industries in improving export to nearby Mexican maquiladoras (factories). The maquiladora program is based on co-production by two plants under a single management, one on each side of the border. Activities addressed four objectives: (1) to determine the dollar value, quantity, and source of the different component parts, materials, supplies, technical design services, equipment and repair services, transportation service, brokerage, and other services purchased by plants operating in the Mexican border area; (2) to determine the potential that South Texas manufacturers, wholesalers, and service companies from Brownsville to Laredo have for supplying maquiladoras with parts, materials, and services and the problems to be overcome in becoming suppliers; (3) to develop a computerized database for matching South Texas manufacturers with maquiladoras; and (4) to determine the general feasibility of establishing one or more business incubators to assist development of a South Texas maquiladora supply industry. Based on results of the study, it was recommended that a task force of representatives from the South Texas manufacturing community and the maquiladora industry, community leaders, public officials, educational leaders, and state and federal agency officials be established to develop and support six specific initiatives for information gathering and dissemination, coordination, and direct technical assistance. (MSE)

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SOUTH TEXAS MAQUILADORA SUPPLIERS PROJECT

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AASCU/ERIC Model Programs Inventory Project

The AASCU/ERIC Model Programs Inventory is a two-year project seeking to establish and test a model system for collecting and disseminating information on model programs at AASCU-member institutions--375 of the public four-year colleges and universities in the United States.

The four objectives of the project are:

- To increase the information on model programs available to all institutions through the ERIC system
- To encourage the use of the ERIC system by AASCU institutions
- To improve AASCU's ability to know about, and share information on, activities at member institutions, and
- To test a model for collaboration with ERIC that other national organizations might adopt.

The AASCU/ERIC Model Programs Inventory Project is funded with a grant from the Fund for the Improvement of Postsecondary Education to the American Association of State Colleges and Universities, in collaboration with the ERIC Clearinghouse on Higher Education at The George Washington University.

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EXECUTIVE SUMMARY

Maquiladora plants operating between Matamoros and Nuevo Laredo in the Mexican State of Tamaulipas along the South Texas border purchased $1.3 billion in component parts and materials from suppliers in 1987. Less than two percent of the purchases were made with companies in South Texas.

The maquiladoras have expressed an interest in buying from South Texas based suppliers. Estimates indicate that if local manufacturers could capture 25 percent of the current component parts and materials market over 10,000 new jobs would be created in the manufacturing and service sectors. This is good news for a region that historically has suffered the nation's highest unemployment rates.

To realize this opportunity however will require that South Texas manufacturers overcome several impediments. Problem areas include inadequate facilities and equipment, a shortage of skilled workers, poor management practices, and the need for capital to finance new business start-ups and expansions.

Several joint private and public sector initiatives could be undertaken to overcome these problems, including efforts to:

1. Continuously update and disseminate information on maquiladora supply market opportunities, including expanding the data bank initiated by the Center for Entrepreneurship and Economic Development at Pan American University;

2. Establish one or more business incubators to assist South Texas manufacturers establish themselves as viable maquiladora suppliers;

3. Strengthen, coordinate and target the efforts of public and private job training programs, including Texas State Technical Institutes (TSTI), private industry councils vocational tech schools, community colleges, and universities to meet the specific trained manpower needs of the maquiladora suppliers;

4. Improve the general business management practices of South Texas manufacturers through the expansion of business development at Pan American University and similar programs in the region;

5. Establish a development fund to meet the special financial needs of South Texas manufacturers seeking to establish themselves as maquiladora suppliers; and

6. Establish a South Texas manufacturers association to bring together maquiladora managers and area manufacturers to share information on business opportunities.

SOUTH TEXAS MAQUILADORA

SUPPLIERS PROJECT

STATEMENT OF PROBLEM

The population of the South Texas border counties of Cameron, Hidalgo, Starr, Webb, Willacy and Zapata doubled between 1950 and 1980, and is expected to double again by the year 2000, when the region's population is forecast to exceed one million two hundred thousand. While farming, ranching and commercial fishing have historically been the economic mainstays of the region the decade of the 1970's saw considerable growth in other important income and job producing sectors, including manufacturing, construction, trade, and services.

Not withstanding these gains the region has long suffered from conditions of poverty and unemployment. Over the past two decades 30 to 40% of South Texas border families have lived in poverty, compared to 11 to 15 percent for the state. (U.S. Census, 1980)

Unemployment rates for the South Texas border region have historically been two to three times higher than the state average with some counties (Starr) exceeding 40 percent. Today, approximately 60,000 South Texas border residents are without work and another 30,000 to 50,000 are underemployed. In March 1988, 62,550 workers or 19.4 percent of the region's labor force was unemployed according to the Texas Employment Commission

(TEC). This compares to an unemployment rate of 8.3 percent for Texas and 5.9 percent for the U.S. for the same month.(TEC, 1988).

The South Texas border area remains underdeveloped compared to the rest of the State. Poor health, low educational achievement and limited job opportunities characterize the region. In 1980, per capita income was $4,416, 40 percent below the state average of $7,205. (U.S. Census, 1980)

Today, the region's economy while experiencing some growth in manufacturing continues to be dominated by agriculture, tourism, trade and services. Jobs are low paying and require minimum skill levels. The public sector (local government and school districts) employs over 20 percent of the region's labor force.(TEC, 1988)

Historically, South Texas border communities have enjoyed close economic ties with their Mexican sister cities along the northern border of the State of Tamaulipas. Mexican workers remain an important source of inexpensive labor for Texas border agricultural and service industries. Mexican consumers are important patrons of border retail establishments, and Mexican investors have played a key role in real estate and construction activities of the region.

U.S. border residents and tourists are frequent shoppers in Mexican border cities. South Texas farmers continue to invest in vegetable production and packing operations along the Mexican border. U.S. investment, direct and indirect, in Mexico's

border manufacturing activities has grown significantly over the past decade.

After a year of intensive work the Texas Border Economic Development Task Force concluded that:

"The State of Texas can no longer afford the luxury of letting the border stagnate and decline. The cost in human misery, in lost opportunities, and in dollars and cents is simply too great.

Sharing an international boundary has intensified the problems. At the same time, Mexico gives the border not only its unique, binational culture, but also its unique economic development potential. Lured by low wages and abundant energy, increasing numbers of manufacturers, U.S. and foreign, are showing interest in the Texas-Mexico border as they seek to meet global competition. The factories (maquiladoras) they establish produce jobs for Texans and Mexicans alike, and generate income ripples throughout the state and nation." (TBED Task Force, 1986)

THE MAQUILADORA PROGRAM

During World War II, Mexican citizens were admitted into the United States under the (agricultural worker) Bracero program to meet seasonal agriculture labor needs at a time of wartime shortages. One result of the program was the attraction of workers and their families to Mexico's northern border. When the program was terminated in 1964, approximately, 185,000 Mexicans were employed on farms and ranches in the United States. Unemployment levels, already high in Mexico's border cities, became much higher with the end of the program and the return of the Mexican workers.

Faced with rising unemployment and a shortage of housing and municipal services in its border cities, Mexico initiated the **Border Industrialization Program (BIP)** in 1965 to alleviate the

problems. Noting the success that Asian countries had in the 1960s in creating jobs for their growing population by securing the assembly and process work of U.S. firms serving American markets, Mexican officials sought to capture similar benefits by designing the BIP to take advantage of provisions of the U.S. Tariff Code.

The BIP provides for the duty free import of machinery, equipment and components for processing and/or assembly within designated areas along the U.S.- Mexico border and interior sites, provided that all the imported products are re-exported. The U.S. Tariff Code (Items 806.3 and 807) permits the re-importation of the processed and/or assembled products into the U.S. and taxes only the value added portion of the goods, which usually consists only of the labor used to produce the product.

The basic concept of the BIP, also known as the maquiladora or "twin-plant" program, is one of co-production. U.S. firms establish two plants under a single management, one on each side of the border. The U.S. plant provides the capital intensive processes of component making and the factory on the Mexico side, the labor-intensive processes of assembly. The U.S. plant supplies its Mexican plant with the component parts and materials and the Mexican plant returns assembled products to the U.S. for possible further processing and shipment to the various markets.

The maquiladora program is an important force in the development of the border region. In addition to the thousands of jobs the program has created for Mexican workers, the program

has become Mexico's second largest foreign exchange earner, behind oil and gas revenues and ahead of tourism. The program is also an employment generator on the Texas side of the border, where hundreds of jobs have been created in such industries as transportation, communications, construction, custom brokerage, and warehousing. In addition, according to many U.S. firms operating maquila plants in Mexico, the program has saved thousands of U.S. jobs that would have otherwise been lost to foreign competition. The maquila program permits U.S. firms to reduce their costs and remain competitive by moving certain portions of their production activities off-shore. (USITC, 1988)

The maquiladora industry has grown from 12 plants employing 3,000 workers in 1966 to 1,350 plants employing 385,000 in 1988. By the year 2000 the industry is projected to have close to 2,000 plants employing three quarters of a million (750,000) workers. Over the past five years (1983-88) the maquiladora industry growth rate has been phenomenal, the number of firms has increased by 115% and employees by 123%. (SCOFI, 1988)

Maquiladoras process and/or assemble a broad range of products ranging from automotive equipment to electric motors, integrated circuit boards, T.V. components, radio receivers, tape decks, hospital supplies, garments and food items. Electrical, textile, and transportation related products account for over 75% of the items handled by the maquiladoras. The majority (over 80%) of the maquiladora plants are located along the 2,300 mile U.S.-Mexico border from Brownsville, Texas to San Diego,

California. The balance (20%) can be found at different sites in the interior of Mexico. (SCOFI, 1988)

In 1987, 54% of the maquiladora plants were either 100% or majority owned by foreign companies, while 46% were either 100% or majority owned by Mexican companies. (SCOFI, 1988) The U.S. is the principal foreign country operating maquiladora plants in Mexico. In recent years interest has been shown by Japanese, European, Korean and Taiwanese companies in establishing co-production operating along the U.S. border.

PREVIOUS STUDIES

While little studied, it is believed that maquiladora operations have made a significant contribution to development of the border by linking together the economies of U.S. and Mexican border communities.

Although there is substantial anecdotal evidence to suggest maquiladoras contribute to economic interdependency along the border, very few empirical studies are available to validate the nature and extent of the relationships.(Martinez, 1978) Case studies providing for the general estimation of the employment, income and expenditure impact of the maquiladora activity on Texas-Mexico border communities indicate mutual benefits are realized by both sides (Mitchell, 1986, Patrick, 1987).

Other researchers have used various methods to estimate the effects of the maquiladoras on border communities. An econometric model using linear regression was employed to

estimate the maquiladora industry employment linkages between the cities of Ciudad Juarez and El Paso (Sprinkle, 1986). An economic base study was utilized to estimate maquiladora related employment, income and expenditure multipliers for Aqua Prieta, Sonora, Mexico. (Ladman, 1972) An input-output model was used to determine the population, employment and expenditure impacts of the maquiladora program on Nogales, Sonora (Ayer, 1974). An econometric evaluation of employment and retail sales effects on four Texas border SMSAs has been conducted. (Holden, 1984)

Stoddard (1987) found that Mexican and U.S. border communities benefited from the maquiladora program. The program provides employment for Mexican border residents, generates local revenues from assessed fees to fund public services, encourages local investment in industrial parks and infrastructure, and spurs growth in such support industries as transportation and business services. U.S. border merchants also benefit from the maquiladora program since a large portion of maquiladora worker wages are spent in the U.S. for clothing, food and recreation. The program also stimulates the development of local component parts supply operations.

The benefits of the maquiladora program for Mexico have not gone unquestioned however (Grunwald, 1985). Negative effects on Mexico's economy and society have been attributed to the assembly operations. Three areas of concern have centered on: the absence of significant linkages of the assembly activities to the Mexican economy, the effects on the labor force in areas where

maquiladoras are concentrated, and the vulnerability of maquiladoras to swings in the U.S. and world economies.

Arguments have been made that by their very nature assembly operations constitute an enclave in the Mexican economy. First, it has been noted that only a small percentage of materials used in the assembly operations is of Mexican origin. Second, although many of the maquiladora plants use sophisticated equipment and technologies, there is little transfer of technology to the rest of the Mexican economy. Third, the employment generated by the maquiladoras tends not to absorb the traditionally unemployed and underemployed males but rather young women who have not previously been in the labor force. Fourth, it is said that maquiladora wages are destined to remain low, not only because of the low skill requirements of assembly operations but also because of the effort to keep such activities attractive to foreign manufacturers. Finally, only a part of the wages paid to maquiladora workers are spent on Mexican goods and services because of the workers and their families shop across the border. Thus, it is argued, that income generated by the maquiladora operations of foreign corporations provide only limited stimulus to the Mexican economy.

Counter arguments note that the institutional framework for maquiladora operations reinforce their economic isolation from the Mexican economy. Overall, while the assertion of low wages is accurate, it must be recognized that minimum wage scales are set and regulated by the Mexican government not the maquiladora

operators. In general, maquiladoras are not permitted to sell in the Mexican marketplace but must export their entire production. Both U.S. and Mexican maquiladora managers report that attempts to increase their use of Mexican components and materials in their assembly operations are fraught with problems. Mexican suppliers cannot meet the maquiladora's vigorous quality control specifications and delivery schedules, their production capacity is insufficient and their prices are too high. Finally, the low participation of Mexican capital and entrepreneurship in maquiladora activities limits the transfer of technology from maquiladora operations to the Mexican economy. Nevertheless, local public officials on both sides of the border acknowledge that the maquiladora plants are an important stimulus to their economies.

Maquiladora plant operators and public officials however express concern and frustration over the inadequacy of local infrastructure -- streets, international bridges, industrial parks, and utilities that limit the growth of the maquiladora industry. In addition, there is growing concern among Mexican officials over the lack of adequate housing, health care and transportation services to accommodate the needs of the rapidly growing maquiladora labor force.

MAQUILADORAS ON THE SOUTH TEXAS BORDER

The general consensus along the South Texas-Mexico border is that the maquiladora industry is mutually beneficial to U.S. and Mexican border communities. There is agreement that efforts should be made to promote its future growth. Of particular interest to Mexican and U.S. officials is finding ways to bring greater integration between border maquiladora activities and the Mexican and U. S. economies. The recent focus of many U.S. border communities has been on the development of their local manufacturing base so as to capture a share of the maquiladora supply market for component parts and materials.

Maquiladora activity has grown in importance along the South Texas-Mexico border over the past decade. The number of maquiladora plants between Brownsville, Tx./Matamoros, Mex. and Laredo, Tx/Nuevo Laredo, Mex., increased by over 56 percent from 73 in 1978 to 114 in 1987. Employment in the maquiladora plants increased by over 100 percent during the same period from 24,000 to 60,000. Preliminary research results based upon interviews with industry representatives and analysis of secondary data indicate that the maquiladora plants are responsible for over 10,000 U.S. border economy jobs from Brownsville to Laredo. (Patrick, 1987)

The payroll for the 60,000 Mexican maquiladora workers in 1987 was estimated to be $130 million, while the payroll for U.S. border residents working in maquiladora-tied jobs was estimated to be $90 million. Mexican maquiladora workers spent an

estimated $40 million in U.S. border communities in 1987, while the combined expenditures of Mexican and U.S. maquiladora-tied workers generated an estimated $10 in sales tax for the State of Texas and $1 million in local sales tax for South Texas border communities. (Patrick, 1987)

In recent years, faced with increasing international competition, the maquiladoras have turned their attention to cutting costs and improving productivity. The focus has been on reducing inventory and transportation costs by emphasizing the replacement of long distance suppliers with local suppliers. Recent estimates (Patrick, 1987) indicate that the 114 maquiladora plants operating between Matamoros, Mex. and Nuevo Laredo, Mex. purchase $1-$3 billion in component parts and materials annually from suppliers located in the midwest and eastern states of the U.S. The Vehicle Safety Division of TRW, in McAllen, Texas, for example, purchases and maintains an inventory of 40,000 individual items on a monthly basis, at a cost of $5 million. Over 95 percent of the items are purchased from suppliers outside the South Texas region. TRW has set for itself, the goal of eventually purchasing 90 percent or more of its component parts and materials from local suppliers. (Rankin, 1987) The company is actively pursuing this goal by seeking out and working with the local manufacturers to develop their capabilities to meet strict TRW quality control standards. Many other maquiladora plants in the region have expressed a strong interest in buying from local suppliers but indicate they do not

have the personnel nor the time to actively seek out and develop local manufacturer/suppliers, as TRW is now doing on a limited scale. It has been estimated that if South Texas manufacturers could capture 25 percent of this multi-billion dollar market, 7 to 8 thousand new jobs could be created along the South Texas-Mexico border. (Patrick, 1987)

Establishing a South Texas **maquiladora** supply industry has indirect as well as direct job creation and economic development benefits. Maquiladora suppliers are manufacturers with material and service needs of their own. Consequently, the opportunity exists to develop a second tier of local firms to supply locally based maquiladora suppliers.

The economic benefits (i.e., new jobs and expenditures) of developing a second tier of local firms to meet the raw product, materials and service needs of a locally based maquiladora supply industry could be considerable.

In 1987, for example, a newly established South Texas manufacturer (supplier) of plastic components for several large maquiladoras spent over $5.0 million on raw materials, equipment, services and supplies. Less than 10% ($50,000) of the material, equipment and other services were purchased from local firms. The firm estimates that more than 75% of its future purchases could be made with local South Texas companies. The materials, equipment, and services purchased range from cutting tools, grinding wheels and blades, sand paper, solvents, emery cloth and belts to metal plating, heat treating and industrial painting.

The firm has plans to increase its sales five fold, to $20 million over the next five years, and will likely spend $15 to $16 million on raw materials and production services. Based upon job to sales ratios for industries producing similar materials and services across the state, the $15 to $16 million in purchases would generate 100 to 150 direct jobs. On a larger scale, it is estimated that if South Texas based maquiladora suppliers could capture 25 percent of the $1-3 billion component parts and materials market a second tier of firms employing 3,500 - 3,750 would be required to supply the locally based maquiladora supply industry.

The total number of new jobs, direct and indirect, created as a result of establishing a South Texas maquiladora supply industry that captures 25% of the existing market would be in the range of 10,500 to 11,750. This is significant in view of the fact that the South Texas border region historically has led the nation in unemployment and poverty.

PROJECT GOAL AND OBJECTIVES

GOAL: To determine the potential for developing a South Texas based maquiladora supply industry. The establishment of the industry would provide for economic diversification and new jobs in the region.

The project goal is consistent with the goals of the U.S. Department of Commerce, EDA's Austin regional office and area economic development efforts by:

A. Creating private sector jobs in severely distressed rural economic area with high unemployment and low per capita income;

B. Promoting private and non-federal public capital formation and investment, economic diversification and enhancement of local economic development capacity;

C. Increasing the competitiveness of U.S. companies in the world economy;

D. Providing an opportunity for agri-business equipment (component and parts) manufacturers to convert over to the production of non-agriculture but related components and parts.

OBJECTIVES: Project activities sought to achieve four objectives:

1. Determine the dollar value, quantity and source of the different component parts, materials, supplies, technical design services, equipment and equipment repair services, transportation services, brokerage and other services purchased by maquiladora plants operating in the Mexican border area and cities of Matamoros, Rio Bravo, Reynosa, Camargo, and Nuevo Laredo.

2. Determine the potential that South Texas manufacturers, wholesalers, and service companies from Brownsville to Laredo have for supplying maquiladoras with component parts, materials and services. Identify the problems (i.e., technical, managerial and financial) that South Texas manufacturers need to overcome in order to become maquiladora suppliers.

3. Develop a computerized data base for matching South Texas manufacturers with maquiladoras to supply component parts, materials and services.

4. Determine the general feasibility of establishing one or more business incubators to assist the development of a South Texas maquiladora supply industry.

PROJECT METHODOLOGY AND RESULTS

Objective 1: Determine the dollar value, quantity and source of the different component parts, materials, supplies, technical design services, equipment and equipment repair services, transportation services, brokerage and other services purchased by maquiladora plants operating in the Mexican border area and cities of Matamoros, Rio Bravo, Reynosa, Camargo and Nuevo Laredo.

The first step in meeting objective 1 required compiling a current list of maquiladoras operating along the South Texas-Mexico border. This was done through consultation with chambers of commerce, industrial development foundations and economic development entities in South Texas as well as the maquiladora associations in Matamoros, Reynosa, Nuevo Laredo, and Mexico's Department of Commercial and Industrial Development (Secretaria de Comercio y Fomento Industrial).

The names and addresses of 114 maquiladoras (for 1987) were obtained in this fashion. In addition, information on the types of products handled was obtained. Based upon available product information the maquiladora plants were classified by two and four digit SIC codes. The complete listing of the maquiladoras can be found in Appendix A.

A breakout of the 114 maquiladora plants by location and SIC code classification follows.

Table 1

Maquiladoras Between Matamoros and Nuevo Laredo By Location, 1987

City	Number	Percent
1. Matamoros -	55	48%
2. Reynosa -	26	23%
3. Nuevo Laredo -	24	21%
4. Cd. Camargo -	5	4%
5. Cd. Rio Bravo -	4	4%
Total	114	100%

Table 2

Maquiladoras Between Matamoros and Nuevo Laredo By SIC Classification, 1987

SIC Classification (Code)	Number	Percent
1. Electronic & Other Electrical Equipment & Components (3600)	41	26.0%
2. Fabricated Metal Products, Except Machinery & Transportation (3400)	14	9.0%
3. Industrial & Commercial Machinery and Computer Equipment (3500)	13	8.0%
4. Transportation Equipment (3700)	12	7.0%
5. Measuring, Analyzing & Controlling Instruments (3800)	11	6.5%
6. Misc. Manufacturing Industries (3900)	10	6.0%
7. Rubber & Misc. Plastic Products (3000)	9	6.0%
8. Leather & Leather Products (3100)	9	6.0%
9. Primary Metal Products (3300)	7	4.0%
10. Stone, Clay, Glass & Concrete Products (3200)	6	4.0%
11. Chemical & Allied Products (2800)	5	3.0%
12. Apparel & Other Finished Products Made from Fabric (2300)	5	3.0%
13. Food & Kindred Products (2000)	5	3.0%
14. Misc. Repair Services (2600)	3	2.0%
15. Furniture & Fixtures (2500)	2	1.0%
16. Textile Mill Products (2200)	2	1.0%
17. Mining & Quarrying of Non Metals Min., Except Fuel (1400)	1	0.5%
18. Lumber & Wood Products, Except Furniture (2500)	1	0.5%
19. Paper & Allied Products (2600)	1	0.5%
20. Printing, Publishing & Allied Industries (2700)	1	0.5%
21. Business Services (7300)	1	0.5%
TOTAL	159	100%

The next step was to develop a questionnaire to be sent to the maquiladoras asking for information on the nature of their current supplier relations. That is, what component parts and

materials were they purchasing, in what quantities and dollar value, and from whom. The maquiladoras were asked about their interest in using local suppliers and under what conditions. They were also asked to provide information regarding their use of local services such as transportation, warehousing, equipment repair, business services and, in general, the types of items and materials they buy from South Texas sources. The questionnaire can be found in Appendix B.

The questionnaires were mailed, with the assistance of the maquiladora associations, to either the plant manager or purchasing agent of the 114 maquiladoras. The response to the questionnaire was poor. Although, forty seven (47) surveys were returned, the majority contained incomplete information. Follow-up phone calls produced some information from an additional 25 firms. Overall, it was felt that the information provided was not adequate to get an accurate measure of the size of the maquiladora market. One reason that many maquiladoras turned out to be an incomplete source of information is that they are subsidiaries of large Fortune 500 companies (i.e., Ford, GM, TRW, G.E., Zenith and Sony) and their purchasing decisions are made at corporate headquarters located elsewhere in the U.S. and not at the local plant. Another reason given by several plant managers was that such information was confidential.

Over 50% (40) of the maquiladoras, however, did indicate interest in using local suppliers. While some of the larger maquiladoras indicated they would like to purchase between 25%-

35% of their component parts and materials locally, the smaller maquiladoras indicated a desire to buy up to 85% (in some cases 100%) locally. The maquiladoras responding to the survey indicated a particular interest in finding reliable local suppliers for: plastics, metal stampings, castings, electronic components, screw machine products, plating, heat treating, and general machining capability.

After failing to acquire the desired market opportunity information directly from the maquiladoras several indirect options were considered. Both the U.S. and Mexican Customs Services maintain records on all merchandise crossing the border, including maquiladora bound shipments. Preliminary contact with each source revealed that the Mexican Customs Service in Mexico City would be the best choice in terms of time and cost.

Volume and dollar value data was obtained from the Mexican Customs Service on all component parts and material shipments for the months of January, May and September of 1987 bound for maquiladora plants operating between Matamoros, Mex. and Nuevo Laredo, Mex., including Rio Bravo, Reynosa, and Camargo. The data was adjusted for seasonality and projected for the entire year.

Study results indicate that in 1987 maquiladora plants between Matamoros, Mex. and Nuevo Laredo, Mex. purchased $1.3 billion in components parts and materials for processing and/or assembly. Literally thousands of different types of items were purchased by maquiladoras. (See Appendix C) Grouping the items

by two-digit SIC Codes permits categorizing the items into 20 groups. Five SIC groups account for 85 percent of the total purchases, while ten groups account for 92 percent. The rank order by dollar value for the SIC groups follows. (Table 3)

TABLE 3

Rank Order of Component Parts and Materials Purchased By Maquiladoras Between Matamoros and Nuevo Laredo By SIC Classification, 1987

RANK	CATEGORY (NAME, SIC)	ANNUAL VALUE (MILLIONS DOLLARS)
1.	Electronic and Other Electrical Equipment and Components, Except Computer Equipment (SIC - 3600)	$ 816
2.	Industrial and Commercial Machinery and Computer Equipment (SIC - 3500)	132
3.	Fabricated Metal Products, Except Machinery and Transportation Equipment (SIC - 3400)	72
4.	Rubber and Miscellaneous Plastics Products (SIC - 3000)	48
5.	Transportation Equipment (SIC - 3700)	48
6.	Chemical and Allied Products (SIC - 2800)	47
7.	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks (SIC - 3800)	42
8.	Primary Metal Industries (SIC - 3300)	36
9.	Food and Kindred Products (SIC - 2000)	24
10.	Misc. Manufacturing Industries (SIC - 3900)	17
11-20.	(All Other SIC Groups)	18
	TOTAL	$1,300

Items (components parts, materials, etc.) purchased by the maquiladoras in 1987 are listed by 4 digit SIC Codes in Appendix C.

The maquiladoras spent nearly $1 billion in 1987 on electronic and other electrical equipment and components, except computer equipment ($816,000,000) and industrial and commercial machinery and computer equipment ($132,000,000). These purchases represent close to 75% of the total purchases made by the maquiladoras in 1987.

The expenditure figure of $1.3 billion for component parts and materials purchased is consistent with previously reported numbers. Mexico's Department of Commercial and Industrial Development (Secretaria de Comercio y Fomento Industrial, SCOFI) reported purchases of $1.2 billion by the maquiladoras in the same region in 1986 (SCOFI, 1988)

For comparative purposes, SCOFI reported total maquiladora purchases of component parts and materials of $4.2 billion for 1986 from Matamoros, Mex. to Tijuana, Mex. Maquiladoras operating along the Texas-Mexico border made purchases of $2.7 billion, or 64% of the total. Maquiladoras in Cd. Juarez accounted for approximately 50% of the purchases, the balance by the maquiladoras operating along the South Texas border. (SCOFI), 1988)

Summary: In 1987, the maquiladora plants operating on the Texas-Mexico border between Matamoros and Nuevo Laredo spent $1.3 billion on component parts and materials. Plants involved in the assembly and/or processing of electronic equipment and components spent in excess of $800,000,000 on component parts and materials. Plants assembling industrial and commercial machinery spent $132,000,000, while plants assembling fabricated metal products spent $72,000,000.

The level of expenditures on component parts and materials is expected to increase significantly over the next 3-5 years as the number of maquiladora plants increase. The maquiladoras have expressed an interest in buying from local suppliers.

Objective 2: Determine the potential for South Texas manufacturers, wholesalers and service companies, from Brownsville to Laredo, to supply maquiladoras with component parts, materials and services. Identify the problems (i.e., technical, managerial and financial) that South Texas manufacturers need to overcome in order to become maquiladora suppliers.

Although the focus of the study was on South Texas manufacturers, an effort was made to determine the level of interest that wholesalers and service companies in the region have for doing business with the maquiladoras. Utilizing information from various sources including chambers of commerce, industrial and economic development foundations, manufacturing directories and the State Comptroller of Public Accounts business franchise list, 303 manufacturers, 211 wholesalers and 228 service companies were identified in the South Texas counties of Cameron, Hidalgo, Starr, Willacy and Webb.

Each business was mailed a questionnaire seeking to identify selected characteristics of their business and determine their interest in doing business with the maquiladora plants in Mexico.

The survey questionnaire forms are contained in Appendix D. The overall response rate to the questionnaires was 29%. The wholesale group had the highest response rate - 37%, followed by manufacturers - 30%, and service companies - 21%. (See Table 4)

Table 4

Distribution of South Texas Businesses By Economic Sector and Number of Surveys Returned

Economic Sector	Number of Surveys Mailed Out	Number of Surveys Returned	Percent Returned
Manufacturers	303	91	30%
Wholesalers	211	78	37%
Service Companies	223	48	21%
TOTAL	742	217	29%

The individual responses for 217 South Texas businesses surveyed are contained in Appendix G.

The distribution of businesses responding to the survey by economic sector, principal product and service are provided in Tables 5,6, and 7.

Table 5

Distribution of Manufacturers By Product

Product	Number	Percent
Food and Kindred Prdts.	3	3%
Textile Mill Prdts.	1	1%
Apparel & Other Textile Prd	4	5%
Lumber & Other Wood Prdts.	4	5%
Chemicals & Allied Prdts.	3	3%
Rubber & Misc. Plastics Prd	13	14%
Stone, Clay & Glass Prdts	4	5%
Fabricated Metal Prdts.	15	16%
Machinery, Except Electrical	25	27%
Electronic & Electronic Equip.	4	5%
Paper & Allied Prdts.	4	5%
Water Transp. Services	1	1%
Transportation Equip.	2	2%
Motor Vehicle & Auto Equip	2	2%
Misc. Durable Goods	1	1%
Misc. Business Services	2	2%
Misc. Repair Shops	3	3 %
TOTAL	91	100%

Table 6

Distribution of Wholesale Businesses
By Product*

Product	Number	Percent
Machine Tools & Supplies	11	14%
Hydraulic & Pneumatic Supplies	12	15%
Power & Transmission Equip. & Sup.	19	23%
Maintenance, Repair, & Oper. Supplies	24	30%
Industrial & Mill Supplies	11	44%
Semi-finished & Finished Materials	2	2%
Other	34	42%

* Because several wholesalers carried more than one product the number of businesses, when added up, exceed the actual number (78) responding to the survey.

Table 7

Distribution Of Service Companies
By Activity

Activity	Number	Percent
Repair and Rebuilding Services	4	8%
Freight Forwarding	16	33%
Custom Brokering	17	35%
Engineering	2	4%
Accounting & Financial	2	4%
Legal	2	4%
Technical Consultant	3	6%
Other	2	4%
TOTAL	48	100%

The principal product and service categories reported by the companies surveyed include: for manufacturing- machinery, except electrical, 27%; for wholesale- industrial and mill supplies, 44%; and, for service- customer brokering, 35% and freight forwarding, 33%.

Although the survey results indicate that several wholesale and service companies are already doing some business with maquiladoras and others would like to, the focus of the study was limited to South Texas manufacturers. Time and available funds did not permit a more detailed look at the wholesaler and service companies. Nevertheless, a separate study of these firms would be appropriate, since they too can be an important source of jobs to the region.

Survey results indicate that 62% of the manufacturers responding to the survey were small, employing under 25 employees. Fourteen percent reported employing over 100 employees. (Table 8)

Table 8

Distribution of Manufacturers By Number Of Employees

Number of Employees	Number	Percent
Under 25	56	62%
25 - 50	13	14%
50 - 100	9	10%
Greater than 100	13	14%
TOTAL	91	100%

The manufacturers reported performing a broad range of industrial processes. (Table 9) Product quality control is critical to securing maquiladora contracts. Most South Texas manufacturers surveyed appear to have a long way to go in this regard. Fewer than half (45%) reported using written quality control procedures. Even fewer reported having segregated inspection areas or utilizing statistical process control procedures. (Table 10)

Table 9

Distribution of Manufacturers By
Processes Performed

Process	Number	Percent
Turning	36	40%
Drilling	45	49%
Milling	35	38%
Boring & Drilling	33	36%
Grinding	40	44%
Sawing & Cutoff	46	51%
Heat Treating	10	11%
Welding	45	49%
Press Working	23	25%
Blow Molding	0	0%
Assembly	39	43%
Plating	4	4%
Inspection & Testing	39	43%
Extruding	1	1%
Injection Molding	7	8%

Table 10

Distribution of Manufacturers By
Quality Control Measures

Measures	Number	Percent
Written Quality Control Procedures	41	45%
Statistical Process Control	26	29%
Segregated Inspection Area	14	15%

Based upon survey information, the manufacturers were classified into three categories: those doing business with maquiladoras; those with an interest in doing business with the maquiladoras; and, those with no interest in doing business with the maquiladoras. Table 11 provides a breakout of the manufacturers based upon this classification. A listing of the manufacturers arranged by 2 and 4 digit SIC Codes is contained in Appendix E.

Table 11

Distribution of Manufacturers Based Upon Present Relationship with the Maquiladoras

Classification	Number	Present
Doing Business	27	30%
Interested in Doing Business	31	34%
Not interested in Doing Business	33	36%
TOTAL	91	100%

Of the 58 manufacturers that indicated they were either doing business with one or more maquiladoras or were interested in doing business, 43 agreed to a plant visit by a manufacturing engineer.

The purpose of the plant visits was to evaluate the firms capability for expanding or initiating a supplier relationship with the maquiladoras . The plant evaluations focused in three areas: adequacy of the firms' existing facilities and equipment; adequacy of the technical knowledge, skill levels and experience possessed by the firms' staff; and adequacy of the firms' general management capability. An attempt was also made to acquire information in a fourth area, the firms' ability to acquire funds for the expansion of facilities, the purchase of equipment, and operating capital.

Table 12 presents information on the current level of business activity that the 27 South Texas manufacturers identified in the survey are doing with the maquiladoras. Total

sales for the 27 firms with the maquiladoras approached $17 million in 1987 and are projected to increase by 30% in 1988, to slightly less than $22 million.

TABLE 12

Distribution of Manufacturers By Industrial Category and Sales 1987 and 1988

Industrial Category	Number Of FIRMS	1987 Sales (000)	1988 Sales (EST) (000)	Percent Change 1987-88
Machinery, Except Elec.	7	$2,075	$2,739	32%
Paper & Allied Prdts.	5	5,850	7,371	26%
Rubber & Misc. Plastic Prdts.	5	5,500	7,351	33%
Fabricated Metal Prdts	4	80	57	(29)%
Lumber & Wood Prdts.	2	495	495	0%
Chemicals & Allied Prdts.	2	2,338	3,051	30%
Misc. Business Services	2	538	871	62%
TOTAL	27	$16,876	$21,935	30%

As a group, the 27 firms were found to possess a wide range of specialized manufacturing expertise that the maquiladoras are looking for, including:

Plastic Products: injection molding, vacuum forming, hot stamping, sonic welding.

Machinery and Precision Machining: milling, boring and drilling, grinding, heat treating, stamping, pantograph and plasma-arc cutting, magnafluxing, plating and anodizing, heliarc welding and centerless grinding.

Fabricated Metal Products: rolling bending, shearing, heliarc, tig and mig welding, stamping and swaging, screw machining, jog boring and can manufacturing.

Electronic Assembly: wave soldering, and plantronic simulating.

Several of the firms possess specialized equipment including CNC (Computer Numerically Controlled) DRO (Digital Readout) equipment, EDM (Electrical Discharge Machine) and CAD/CAM (Computer Aided Design and Manufacturing) capabilities. Average production capacity utilization for the 27 firms was 43%, ranging from a low of 21% to a high of 90%.

Although it was determined that many of the firms have the necessary facilities, equipment, skilled workers, and experience to supply the maquiladoras, the majority face hurdles in converting their excess capacity into more maquiladora business. Securing large volume contracts will require major improvements in areas of quality control and assurance, delivery time, and price. To achieve these improvements will require in most cases modifications in existing facilities and equipment, the adoption of quality control programs and improvements in key management areas of cost accounting, financial analyses, procurement and marketing.

Bidding on maquiladora contracts is very competitive. Frequently only a few pennies on a per unit job quote seperate competing bidders. Firms that do not have a good understanding of their costs find themselves losing contracts or often being awarded contracts that end up costing them more to meet than they can earn.

Table 13 presents a summary of the results of plant visits/evaluations to 16 South Texas manufacturers that expressed an interest in doing business with the maquiladoras. The manufacturers fall into five product categories: Chemicals and Allied Products; Rubber & Miscellaneous Plastic Products; Fabricated Metal Products; Machinery, Except Electrical; and Electrical & Electronic Equipment.

Overall, only 31% of the firms were found to have adequate facilities and equipment for producing component parts and materials for the maquiladoras, 56% had adequate technical knowledge and experience, and 38% had adequate management skills and systems. (Table 14)

Table 13

Distribution of Manufacturers By Product Category and Selected Characteristics

Product Category	Facilities & Equip. Adq.	Facilities & Equip. Not Adq.	Tech. Skills Adq.	Tech. Skills Not Adq.	G. Management Adq.	G. Management Not Adq.
Chemicals & Allied Prdts.						
Firm A		X	X			X
Rubber & Misc. Plastic Prdts.						
Firm B	X		X		X	
Firm C		X		X		X
Firm D		X		X	X	
Fabricated Metal Prdts.						
Firm E		X		X		X
Firm F		X		X		X
Firm G	X		X		X	
Firm H		X	X			X
Machinery, Except Elec.						
Firm I		X	X			
Firm J	X			X		X
Firm K		X	X		X	
Firm L	X			X		X
Firm M		X		X	X	
Firm N		X	X			X
Electrical & Electronic Equip.						
Firm O	X		X		X	
Firm P		X	X			X

Table 14

Distribution of Manufacturers By
Performance Measures

	Facilities & Equipment	Technical Knowledge & Skills	General Management
Number of Firms Adequate	5	9	6
Number of Firms Inadequate	11	7	8
Percent of Firms Adequate	31%	56%	38%

In determining whether or not a firm had adequate facilities and equipment consideration was given to the presence of such factors as reinforced concrete foundations, industrial power supply wiring, dock high loading facilities, machine and tool maintenance shops, climatically controlled work environments, state of the art equipment and machinery, and quality control and equipment procedures .

In the area of technical skills, attention was given to the availability of qualified personnel in the areas of engineering, design, machining, tooling, finishing, heat treating, maintenance and quality control.

The firms were also evaluated on their general management practices and capability in key areas of planning, accounting, financial analysis, procurement and marketing.

As evidenced by the evaluations (Table 13), most of the manufacturers need to make improvements in all areas: facilities

and equipment; technical knowledge and skills; and, general management practices.

Financing the expansion of facilities and the purchase of equipment will also be a problem for many firms. Not because their businesses do not have potential, but because they do not have a proper business plan, including appropriate market information and financial statements (e.g. cash flow, balance sheet, income statement) to present to prospective funding sources.

In most cases, where new equipment and machinery is to be purchased and expansion is needed, there will also be a need to improve the knowledge and skills of the workforce. A general impediment identified by the study to the future development of a South Texas maquiladora supply industry is the absence of an adequately skilled workforce. Skill shortages exist in the areas of engineering (mechanical, electrical and chemical), skilled tool and die makers, and people with experience in plastic injection molding, metal stamping, plating, castings, screw machining, and general machining.

Summary: In 1987, 27 South Texas manufacturers had sales of $16 million with maquiladoras. Although the interest is strong among South Texas firms to supply maquiladoras, the majority face impediments including inadequate facilities and equipment, an inadequately trained workforce, undercapitalization and poor business management practices. Overcoming these problems will open the door for many South Texas firms to the growing maquiladora market.

Objective 3: Develop a computerized data base for matching South Texas manufacturers and maquiladoras to supply for component parts, materials and services.

In establishing a computerized data base the first step taken was to classify the maquiladoras (114) and South Texas manufacturers (91) by two and four digit SIC (product) Codes. Using SIC Codes as the common denominator a computer program was developed to match the maquiladoras and manufacturers.

A listing of the maquiladoras and South Texas manufacturers classified by SIC Codes that form the data base can be found in Appendix F.

Matching maquiladoras and South Texas manufacturers by SIC Codes is just the starting point. Whether the matches lead to actual contracts can only be determined after additional study and negotiations takes place between the two parties. Such an endeavor is beyond the scope of this study.

Although only 58 of the 91 South Texas manufacturers surveyed indicated an interest in expanding or initiating business activity with the maquiladoras, all 91 firms are included in the data base.

Summary: A data base that matches South Texas manufacturers and maquiladoras by SIC Codes was established. Several potential matchups have been identified.

Objective 4: Determine the general feasibility of establishing one or more business incubators to assist in the development of a South Texas maquiladora supply industry.

Business incubators are facilities that provide small start-up firms with affordable and flexible space, shared support services and business development services, such as financing, marketing and management. There are over 275 incubators in the U.S. today helping young businesses survive and grow during the start-up period when they are most financially vulnerable. Manufacturers, research and development firms, and retail and service companies benefit from the sheltered and nurturing environment of incubators.

According to National Business Incubators Association, 80 percent of companies nurtured in incubators survive, as opposed to an 80 percent failure rate after five years for small businesses in general. The Association estimates that by 1991 there will be over 1,000 incubator facilities across the country.

Incubators established to assist manufacturers provide tenants with functional and flexible space including proper power hook-ups and loading docks and staging areas. Tenants are provided with a wide range of shared services that normally include: administrative and secretarial services; receptionists/answering services; conference rooms; computer resources; word processing; photocopying; A/V equipment; telecommunications equipment and services; and, warehousing, shipping and receiving.

Tenants benefit from on-site technical assistance with engineering, production, and quality control problems as well as professional services in the areas of business management, accounting, marketing finance and legal resources. Some incubators provide tenants with customized job training programs.

Incubators have had a significant impact on local economies across the nation through the spawning of viable business that create jobs, promote investment, diversify the economy and broaden the tax base. Incubators have also played a key role in technology innovation, development and transfer.

Under present circumstances, the establishment of one or more business incubators to assist struggling South Texas manufacturers establish themselves as maquiladora suppliers has considerable merit. Of the 16 South Texas firms surveyed in this study that are seeking to establish themselves as maquiladora suppliers, less than a third were judged to have adequate facilities and equipment to accomplish their objective. Slightly over half had the required knowledge and skills, while less than 40 percent operated with adequate business management procedures and practices. An incubator could provide substantial assistance to these firms and new start-ups.

While conducting a detailed feasibility study to determine the precise design that an incubator for maquiladora suppliers should take is beyond the scope of this study, some general points can be.

It would be appropriate to start on a small scale focusing in those areas where success is likely to occur based upon current market demand conditions and the capability possessed the South Texas manufacturing community to respond. In terms of demand, areas of plastic injection molding, metal stamping, plating and screw machine operations are the strongest. Presently, in the South Texas manufacturing community there exists considerable experience in metal stamping and screw machining. Although experience in plastic injection molding and plating exists to a much lesser degree, qualified individuals from other parts of the country are finding their way to South Texas seeking to establish themselves in these fields.

In general, the South Texas manufacturing community possess the basic experience needed in these fields to get started. What is lacking are the resources necessary to develop and establish such an industry. Constraints include the large investments in facilities and equipment necessary to get started. Even small operations will require $3-$5 million dollar investments during the first few years. An adequately trained workforce presents another problem. Although there are some highly skilled individuals available, eventually hundreds will need to be trained if the businesses are to operate on a viable scale. Finally, being technically competent is not a guarantee to success in business. Becoming a **maquiladora** supplier is very

competitive. Only those manufacturers that are on top of all aspects of their business will prosper. Cost accounting, inventory control and pricing are critical areas. Personnel management is important. And perhaps most important of all is knowing the condition and needs of the business and being able to communicate this to local banks or out of town venture capitalists. Without adequate financing the business is sure to fail no matter what the quality of their product.

Summary: Establishing one or more incubators to nurture South Texas manufacturers has considerable merit. The idea is particularly attractive in light of the successes incubators have had around the country.

Conclusions

The purpose of the study has been to determine the potential for establishing a South Texas industry to supply maquiladora along the Texas-Mexico border with component parts and materials. Study results confirm that many South Texas firms are currently supplying maquiladoras and that the opportunity exists to expand the level of business activity significantly.

In 1987, maquiladoras operating in Mexican communities from Matamoros to Nuevo Laredo spent an estimated $1.3 billion on component parts, materials and other items that were supplied almost exclusively by sources outside of South Texas. Studies estimate that if South Texas manufacturers could capture 25 percent of this market, over 10,000 new jobs, many of a higher skill and high wage nature, would be created in the South Texas economy. Clearly that would be good news to a region that

historically has suffered the nation's highest unemployment rates.

Presently only a fraction (less than 2 percent) of the maquiladora component parts and materials market is being supplied by South Texas firms. While the study confirmed that there is considerable interest on the part of the South Texas business community to take advantage of the market opportunity that the maquiladoras offer, it is clear that several impediments will have to be overcome before this can happen. Problems include inadequate facilities and equipment, a shortage of skilled workers, poor business management practices, and the need for capital to finance new business start-ups and expansions. These problems are manageable given proper attention.

Recommendations

Many South Texas entrepreneurs, public officials and community leaders are keenly aware of the opportunity that the maquiladoras hold for the economic growth of the region. They also recognize that significant impediments must be overcome if this opportunity is to be turned into reality.

As such, and based upon the results of the study, it is recommended that a task force comprised of representatives from the South Texas manufacturing community, the maquiladora industry, community leaders, public officials, educational leaders, state and federal agency officials be established to develop and support several initiatives including efforts to:

1. Continuously update and disseminate information on maquiladora supply market opportunities, including expanding the data bank initiated by the Center for Entrepreneurship and Economic Development at Pan American University;

2. Establish one or more business incubators to assist South Texas manufacturers establish themselves as viable maquiladora suppliers;

3. Strengthen, coordinate and target the efforts of public and private job training programs, including Texas State Technical Institutes (TSTI), private industry councils, vocational tech. schools, community colleges, and universities to meet the specific trained manpower needs of the maquiladora suppliers;

4. Improve the general business management practices of South Texas manufacturers through the expansion of business development at Pan American University and similar programs in the region;

5. Establish a development fund to meet the special financial needs of South Texas manufacturers seeking to establish themselves as a maquiladora supplier; and,

6. Establish a South Texas manufacturers association to bring together maquiladora managers and area manufacturers to share information on business opportunities.

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APPENDIX A

MAQUILADORAS BETWEEN MATAMOROS AND NUEVO LAREDO, MEXICO CLASSIFIED BY PRODUCT (SIC) CATEGORY

SIC 1400: Mining & Quarrying of Nonmetallic Min., Except Fuel

1479 Normetales, S.A. de C.V., Ciudad Reynosa

SIC 2000: Food & Kindred Products

2033 Empacadora Calmo, S.A., Ciudad Reynosa
2087 Conacit de Reynosa S.A. de C.V., Ciudad Reynosa
2092 Mariscos de Matamoros, S.A., Matamoros
2092 Procesadora de Mariscos, Bagdad, S.A., Matamoros
2099 Tex-Tex, S.A., Matamoros

SIC 2200: Textile Mill Products

2221 Maquiladora General de Matamoros, Matamoros
2253 Maquilas Industriales de la Frontera, S.A., Rio Bravo

SIC 2300: Apparel and Other Finished Products Made From Fabric

2331 Rio Contratos de Costura, S.A. de C.V., Cd. Camargo
2342 Rey-Mex Bra, S.A. de C.V., Reynosa
2385 Fisher Price de Mexico, S.A. de C.V., Matamoros
2392 Neco de Mexico, S.A., Matamoros
2392 Fisher Price de Mexico, S.A. de C.V., Matamoros
2394 Frieba de Mexico, S.A., Nuevo Laredo

SIC 2400: Lumber & Wood Products, Except Furniture

2434 Jesus Flores Merlos, Nuevo Laredo

SIC 2500: Furniture & Fixtures

2511 Rosa Alvarado Nabor, Nuevo Laredo
2531 Asientos Para Trans. de Mexico, S.A., Nuevo Laredo

SIC 2600: Paper & Allied Products

2656 Tex-Tex, S.A. Matamoros
2679 Tex-Tex, S.A. Matamoros

SIC 2700: Printing, Publishing, and Allied Industries

2741 Producciones Impacto de Mexico, Nuevo Laredo

2789 Producciones Impacto de Mexico, Nuevo Laredo

SIC 2800: Chemicals & Allied Products

2819 Productos de Preservacion, S.A., Matamoros
2834 Agroquimicos y Equipos S.A., Matamoros
2865 Productos de Preservacion, S.A., Matamoros
2891 Alfa Celulosa de Mexico, S.A., Rio Bravo
2899 Tex-Tex, S.A., Matamoros

SIC 3000: Rubber & Miscellaneous Plastics Products

3021 Mex-Moc De Mexico, S.A., Nuevo Laredo
3021 Calzado Deportivo de Reynosa, S.A., Ciudad Reynosa
3052 Mangueras Porosas de Mexico, S.A. de C.V., Matamoros
3052 Leece Neville de Mexico S.A. de C.V., Matamoros
3069 Brownsville Rubber Co. S.A., de C.V., Matamoros
3069 Genesco de Mexico, S.A. de C.V., Ciudad Reynosa
3069 Fisher Price de Mexico, S.A. de C.V., Matamoros
3089 Glasmex, S.A., Matamoros
3089 Electro Semblies de Mexico, S.A., Matamoros

SIC 3100: Leather & Leather Products

3131 Genesco de Mexico, S.A. de C.V., Ciudad de Reynosa
3142 Barry de Mexico, S.A., Nuevo Laredo
3171 Bolsas de Laredo, S.A., Nuevo Laredo
3172 Cobar, S.A. de C.V., Nuevo Laredo
3172 Altos Cosmeticos, S.A., de C.V., Nuevo Laredo
3199 Maquila de Autopartes, S.A., de C.V., Nuevo Laredo
3199 Hamill Mexico, S.A. de C.V., Ciudad Reynosa
3199 Datacom de Mexico, S.A. de C.V., Ciudad Reynosa
3199 Condura, S.A. de C.V., Matamoros

SIC 3200: Stone Clay, Glass, Concrete Products

3229 Neco de Mexico, S.A. de C.V., Matamoros
3231 Plews, S.A. de C.V., Matamoros
3264 Delredo, S.A. de C.V., Nuevo Laredo
3264 Auto Industrial de Partes, S.A. de C.V., Matamoros
3264 Maquiladora Mexa, S. de R.L. de C.V., Matamoros
3291 Especialidades de Reynosa, S.A.de C.V., Ciudad Reynosa

SIC 3300: Primary Metal Products

3312 Dura de Mexico, S.A.de C.V., Matamoros
3312 Fabricacion Metalica de Matamoros, S.A., Matamoros
3314 Cortes del Bravo, S.A. de C.V., Rio Bravo
3317 Industrias de Conectores de Matamoros, S.A. Matamoros

3339 Normetales, S.A. de C.V., Ciudad Reynosa
3356 Metales Federados, S.A., Matamoros
3365 Maquilas Medicas, S.A. de C.V., Ciudad Reynosa

SIC 3400: Fabricated Metal Products, Except Machinery & Tran

3423 Especialidades de Reynosa, S.A.de C.V., Ciudad Reynosa
3423 Plews, S.A.de C.V., Matamoros
3429 Auto Industrial de Partes, S.A., Matamoros
3429 Industrias W.R.E.N, S.A. de C.V., Matamoros
3429 Candados Universales de Mexico, S.A.de C.V., Matamoros
3433 Tideland de Mexico, S.A.de C.V., Ciudad Reynosa
3442 Puertas y Vidrios de Matamoros, S.A.de C.V., Matamoros
3462 Datacom de Mexico, S.A.de C.V., Ciudad Reynosa
3469 Partes de Television de Reynosa, S.A., Ciudad Reynosa
3471 Arte Tubular, S.A., Ciudad Reynosa
3491 Condura, S.A., de C.V., Matamoros
3494 Nibco de Reynosa, S.A.de C.V., Ciudad Reynosa
3499 Frieba de Mexico, S.A., Nuevo Laredo
3499 Candados Universales de Mexico, S.A.de C.V., Matamoros

SIC 3500: Industrial & Commercial Machinery & Computer Equipment

3524 Asientos Para Transportacion de Mexico, Nuevo Laredo
3531 Manimex, S.A., Ciudad Reynosa
3532 V.M.C. de Matamoros, S.A.de C.V., Matamoros
3544 Fundidora de Acero Rio Grande, S.A., Ciudad Camargo
3545 V.M.C. de Matamoros, S.A.de C.V., Matamoros
3545 Manufacturera Fronteriza, S.A. de C.V., Cd. Camargo
3545 Cedro de Mexico, S.A.de C.V., Matamoros
3552 Coil Company de Mexico, S.A. de C.V., Matamoros
3552 Aerotech de Matamoros, S.A., Matamoros
3552 Lepco, S.A., Matamoros
3559 Ideal Equipment de Mexico, S.A., Matamoros
3567 Coil Company de Mexico, S.A. de C.V., Matamoros
3571 Manufacturas Industriales Sigma, S.A., Ciudad Reynosa

SIC 3600: Electronic & Other Electrical Equipment & Components

3612 Productos Electronicos, S.A.de C.V., Reynosa
3612 Ma. De. Lourdes del Valle Canseco, Nuevo Laredo
3612 Border Electronicas Mexicana, Matamoros
3612 Lambda Electronics de Mexico, S.A., Ciudad Reynosa
3613 Electro Semblies de Mexico, S.A., Matamoros
3613 Ideal Equipment de Mexico, S.A., Matamoros
3613 Delnosa, S.A. de C.V., Ciudad Reynosa
3613 Ensambladora Ind. Mecanico Auto. SA de CV Nuevo Laredo
3613 Neco de Mexico, S.A. de C.V., Matamoros
3621 Sistemas de Energia de Matamoros, S.A., Matamoros
3621 Cedro de Mexico, S.A. de C.V., Matamoros
3621 Sociedad de Motores Domesticos, S.A., Cd. Reynosa

3621 Ensambladora de Matamoros, S.A., Matamoros
3621 Recicladora de Metales de Matamoros, Matamoros
3621 Singer Precisions Generales de Mex. S.A.C.V.,Matamoros
3621 Areotech de Matamoros, S.A., Matamoros
3625 Electronic Control Corporation de Mexico SA, Matamoros
3625 Areotech de Matamoros, S.A., Matamoros
3625 Border Electronicas Mexicana, Matamoros
3625 Duro de Mexico, S.A. de C.V., Matamoros
3625 Lambda Electronics de Mexico, S.A., Ciudad Reynosa
3625 Duro de Matamoros, S.A. de C.V., Matamoros
3629 Kemet de Mexico, S.A.de C.V., Matamoros
3634 Ensambladora Ind. Mecanico Auto. SA de CV Nuevo Laredo
3634 Neco de Mexico, S.A. de C.V., Matamoros
3641 Componentes de Iluminacion de Mexico, Sa, Nuevo Laredo
3641 Electro Partes de Matamoros, S.A.de C.V., Matamoros
3643 Porta Sistemas, S.A. de C.V., Matamoros
3644 Springfield Wire de Mexico, S.A.de C.V., Nuevo Laredo
3647 Industrias Thompson de Mexico, S.A. de CV, Cd. Camargo
3647 PEA Industrail, S.A. de C.V., Rio Bravo
3647 Auto Industrial de Partes, S.A.de C.V., Matamoros
3651 Deltronicos de Matamoros, S.A. de C.V., Matamoros
3651 CTS de Mexico, S.A. de C.V., Matamoros
3661 Porta Sistemas, S.A. de C.V., Matamoros
3663 Winegard de Mexico, S.A. de C.V., Matamoros
3663 Areotech de Matamoros, S.A., Matamoros
3672 Deltronicos de Matamoros, S.A. de C.V., Matamoros
3674 Electronic Control Corporation de Mexico SA, Matamoros
3674 Lambda Semiconductor, S.A., Ciudad Reynosa
3674 TRW electronica Ensambles, S.A., Ciudad Reynosa
3674 Partes de Television de Reynosa, S.A.deC.V. Cd.Reynosa
3676 Leece Neville de Mexico, S.A.de C.V., Matamoros
3677 Ma. Lourdes del Valle Canseco, Nuevo Laredo
3677 Mexiensambles Electronicos, S.A., C.V., Matamoros
3677 Condura, S.A. de C.V., Matamoros
3677 Cedro de Mexico, S.A. de C.V., Matamoros
3677 Lepco, S.A., Matamoros
3679 CTS de Mexico, S.A. de C.V., Matamoros
3679 Ensambladora Ind. Mecanico Auto. SA de CV Nuevo Laredo
3679 Kimco, S.A., Ciudad Reynosa
3679 Maquiladora Mexa, S. de R.L. de R.L. de CV, Matamoros
3679 Condura, S.A. de C.V., Matamoros
3679 Productos Electronicos, S.A.de C.V., Reynosa
3694 K.L.H. de Mexico, S.A. de C.V., Matamoros
3694 Industrias Thompson de Mexico, S.A. de CV, Cd. Camargo
3694 Sistemas E Instrumentaciones, S.A. de CV, Nuevo Laredo
3694 Deltronicos de Matamoros, S.A. de C.V., Matamoros
3695 Magneticos de Mexico, S.A. de C.V., Nuevo Laredo

SIC 3700: Transportation Equipment

3711 Eagle Allen Executive Automobile, Nuevo Laredo
3714 La Mosa, S.A., Nuevo Laredo
3714 Industrios Fronterizos Cm. S.A. de C.V., Nuevo Laredo

3714 Lasco Neville de Mexico S.A. de C.V., Matamoros
3714 Delredo, S.A. de C.V., Nuevo Laredo
3714 Auto Industrial de Partes, S.A. de C.V., Nuevo Laredo
3714 Componentes Mecanicos de Matamoros SA de CV, Matamoros
3714 Rimir, S.A. de C.V., Matamoros
3714 Trico Componentes, S.A. de C.V., Matamoros
3714 Electronic Control Corporation de Mexico SA, Matamoros
3714 Ensambladora Ind. Mecanico Auto. SA de CV Nuevo Laredo
3714 Auto Trim de Mexico, S.A. de C.V., Matamoros

SIC 3800: Measuring, Analyzing, & Controlling Instruments

3822 Condura, S.A. de C.V., Matamoros
3822 Controles Reynosa, S.A. de C.V., Ciudad Reynosa
3822 Neco de Mexico, S.A. de C.V., Matamoros
3822 Ranco de Mexico, S.A. de C.V., Matamoros
3822 Ranco de Mexico, S.A. de C.V., Matamoros
3823 Ideal Equipment de Mexico, S.A., Matamoros
3823 Deltronicos de Matamoros, S.A. de C.V., Matamoros
3825 Condura, S.A. de C.V., Matamoros
3825 CTS de Mexico, S.A. de C.V., Matamoros
3825 Cedro de Mexico, S.A. de C.V., Matamoros
3829 Neco de Mexico, S.A. de C.V., Matamoros
3842 Plews, S.A. de C.V., Matamoros
3843 Manufacturera Fronteriza, S.A., Cd. Camargo
3873 Ranco de Mexico, S.A. de C.V., Matamoros

SIC 3900: Miscellaneous Manufacturing Industries

3915 Maquiladora Aurea, S.A., Cd. Camargo
3931 Datacom de Mexico, S.A. de C.V., Ciudad Reynosa
3942 Fisher Price de Mexico, S.A. de C.V., Matamoros
3944 Modelos Magnificos, S.A. de C.V., Matamoros
3991 Aerotech de Matamoros, S.A., Matamoros
3991 Cepillos de Matamoros, S.A. de C.V., Matamoros
3999 Manufacturas Ilimitadas S.A. de C.V., Matamoros
3999 Sistemas de Energia de Matamoros, S.A., Matamoros
3999 Ranco de Mexico, S.A. de C.V.
3999 Plews, S.A. de C.V., Matamoros

SIC 7300: Business Serives

7389 A.C. Nielsen Co. de Mexico, S.A. de C.V., Nuevo Laredo

SIC 7600: Miscellaneous Repair Services

7623 Industrias Nuevo Laredo, S.A. de C.V., Cd. Reynosa
7641 Arte Tubular, S.A., Ciudad Reynosa
7699 Aereo Reparaciones, S.A. de C.V., Nuevo Laredo

APPENDIX C

COMPONENT PARTS, MATERIALS AND OTHER ITEMS PURCHASED BY MAQUILADORAS BETWEEN MATAMOROS AND NUEVO LAREDO, MEXICO, 1987

SIC CODE	PRODUCT CATEOGORY	PURCHASES PER MONTH (DOLLARS)
3600	Electronic and Other Electrical Equipment and Components, Except Computer Equipment	$ 67,512,542
3500	Industrial and Commercial Machinery and Computer Equip.	11,441,878
3400	Fabricated Metal Products, Except Machinery and Transportation Equip.	6,466,030
3000	Rubber and Miscellaneous Plastics Products	4,191,335
3700	Transportation Equipment	4,032,672
2800	Chemicals and Allied Products	3,791,389
3800	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks	3,491,058
3300	Primary Metal Industries	3,137,876
2000	Food and Kindred Products	1,686,199
3900	Miscellaneous Manufacturing Industries	1,393,483
2200	Textile Mill Products	1,171,374
2600	Paper and Allied Products	917,673
2300	Apparel and Other Finished Products Made From Fabrics and Similar Materials	852,626
3200	Stone, Clay, Glass, and Concrete Products	819,303
1000	Metal Mining	317,888
5000	Wholesale Trade-Durable Goods	279,567
3100	Leather and Leather Products	145,657

2700	Printing, Publishing, and Allied Industries	125,731
0000	Miscellaneous	93,635
2500	Furniture and Fixtures	92,065
2400	Lumber and Wood Products, Except Furniture	77,482
2900	Petroleum Refining and Related Industries	64,458
5100	Wholesale Trade-Nondurable Goods	55,537
1400	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	8,174
1700	Construction-Special Trade Contractors	4,197
5700	Home Furniture, Furnishing, and Equipment Stores	3,092
0100	Agricultural Production-Crops	1,702
0800	Forestry	293
TOTAL		$ 112,174,916

APPENDIX E

SOUTH TEXAS MANUFACTURERS
CLASSIFIED BY PRODUCT (SIC) CATEGORY

Key: (Y) - Doing business with maquiladoras
(N) - Not doing business with maquiladoras
(I) - Interested in doing business with maquiladoras

SIC 2000: Food & Kindred Products

2076 Open Sesame Commodities, Inc., Brownsville (N)
2093 Open Sesame Commodities, Inc., Brownsville (N)
2097 McAllen Ice Company, McAllen (I)
2097 Southeastern Public Service Co., Harlingen (I)

SIC 2200: Textile Mill Products

2299 Lottie Lee Co., Laredo (Y)

SIC 2300: Apparel & Other Textile Products

2328 Valley Uniforms, Inc., McAllen (I)
2337 St. Mary's Industries, Edcouch (I)
2342 Form-O-Uth, Inc., McAllen (N)
2349 Hilco Inc., Harlingen (I)

SIC 2400: Lumber & Wood Products

2439 Los Fresnos Truss Company, Los Fresnos (N)
2448 Woodstock Mfg. Co., Inc., McAllen (Y)
2448 Georgia Pacific Corporation, Harlingen (I)
2449 Age Industries, Inc., San Benito (I)

SIC 2600: Paper & Allied Products

2653 Weyerhaeuser Paper Company, McAllen (Y)
2653 Kenneth Fox Supply Co., McAllen (Y)
2653 Valley Packaging, McAllen (Y)
2653 International Paper, Edinburg (Y)
2653 Age Industries, Inc., San Benito (I)

SIC 2800: Chemicals & Allied Products

2851 Polibrid Coatings, Inc., Brownsville (N)
2851 Potter Paint Co. of Texas, Inc., Brownsville (Y)
2869 J & B Industries, San Benito (I)

SIC 3000: Rubber & Misc. Plastic Products

3069 Kolder, Inc., Edinburg (N)
3079 Mad-Way-Ler, Inc., McAllen (I)
3079 Unit Source, Inc., La Feria (Y)
3079 Criterion Plastics, Inc., Kingsville (Y)
3079 Videocraft Manufacturing Company, Laredo (Y)
3079 Port Isabel Plastics, Inc., Port Isabel (Y)
3079 Kinney Bonded Warehouse, Inc., Donna (I)
3079 Valley Plastic Supply, Inc., Weslaco (N)
3079 King's Prosperity Industries, McAllen (Y)
3079 Chem-Pruf Door Co., Inc., Brownsville (N)
3079 Brownsville Molding, Brownsville (Y)
3079 Rio Grande Plastic, Products, Pharr (Y)
3079 Regency Plastics, McAllen (Y)

SIC 3200: Stone, Clay, & Glass Products

3231 The Glass Shop, Brownsville (N)
3291 Norton Company, Brownsville (N)
3295 Oglebay Norton Company, Brownsville (I)
3299 Barium Supply Company, Brownsville (N)

SIC 3400: Fabricated Metal Products

3411 South Texas Can Company, Inc., Weslaco (I)
3441 Palmer Steel Supplies, Inc., McAllen (I)
3441 Marathon Letourneau (Gulf Marine) (N)
3442 Tex-Steel Corporation, Harlingen (N)
3443 Stuart Manufacturing Inc., Edinburg (I)
3443 Semco Mfg. Company, Pharr (I)
3443 Guenzel Metal Products, Inc., Harlingen (N)
3443 Tigra International, Inc., McAllen (I)
3443 Brees-Brac Company, Port Isabel (I)
3444 Brownsville Sheet Metal, Brownsville (N)
3444 Alfredo's Sheet Metal Shop, Weslaco (N)
3451 Young Dental Manufacturing Corp., Brownsville (Y)
3469 Brees-Brac Company, Port Isabel (I)
3482 National Medical Care, McAllen (N)
3498 McAllen Pipe & Supply, Inc., McAllen (I)
3499 Marathon Letourneau (Gulf Marine) (N)

SIC 3500: Machinery, Except Electrical

3523 Frontier Industries, Inc., Raymondville (N)
3523 Emroth Company DBA Emair, Harlingen (N)
3541 Scalise & Co. Inc., McAllen (Y)
3542 Scalise & Co. Inc., McAllen (Y)
3542 Clear-Tex, Inc., Laredo (Y)
3544 Clear-Tex, Inc., Laredo (Y)
3544 Ten-Tex Tool & Supply Co., Laredo (Y)
3544 Astex Tool & Manufacturing Inc., McAllen (Y)
3544 Precision Products Company, Brownsville (Y)
3544 Texas Prescision Company, Brownsville (Y)
3544 Modern Machine Shop, Laredo (I)
3544 Valley Tool & Die, Inc., Alamo (I)
3544 Sauceda's Prescision Grinding, Inc., San Benito (Y)
3544 Colbert Manufacturing Co., Inc., Laredo (Y)
3544 International Mfg. Services, Harlingen (I)
3551 Rio Grande Tool Company, Brownsville (Y)
3551 Sort-Rite International, Inc., Harlingen (N)
3559 Thompson Mfg. Company, Harlingen (N)
3569 Roforsa, Incorporated, Laredo (Y)
3592 Velcon Filters, Inc., Harlingen (I)
3599 Instrumentation Products, Inc., Harlingen (I)
3599 Brownsville Machine Shop Inc., Brownsville (I)
3599 Morales Machine Shop, Laredo (I)
3599 Border Machine Shop, Inc., Laredo (N)
3599 Crow Iron & Supply Company, Edinburg (I)
3599 Joe Summers & Co., Weslaco (I)
3599 Delta Machine Company, Brownsville (N)
3599 Balch Machine Co., Inc., Mission (I)
3599 Texas Tool Company, McAllen (N)

SIC 3600: Electric & Electronic Equipment

3661 Intellicall Mfg., Inc., Pharr (I)
3664 Calidad Electronics, Inc., Edinburg (I)
3674 Calidad Electronics, Inc., Edinburg (I)
3674 Tracor Aerospace, Inc., Laredo (I)
3679 Tracor Aerospace, Inc., Laredo (I)
3679 Carlingswitch, Inc., Brownsville (N)

SIC 3700: Transportation Equipment

3729 Stinar Corporation of Texas, Harlingen (I)
3731 Marine Railway, Inc., Brownsville (I)
3732 Low Tide International, Inc., McAllen (I)
3732 B & B Boat Building, Inc., Brownsville (I)
3742 Anabel Corporation, Brownsville (I)

SIC 4400: Water Transportation

4469 Ferromar, Inc., Brownsville (I)

SIC 5000: Wholesale Trade-Durable Goods

5093 Anglo Iron & Metal Company, Brownsville (I)

SIC 7300: Business Services

7397 Pan American Laboratories, Inc., Brownsville (I)
7399 Funco Inc., Edinburg (I)

SIC 7500: Automotive Repair and Services.

7538 Tek Turbine, Brownsville (N)

SIC 7600: Miscellaneous Repair Services

7692 Roth-Gutierrez Texano, Inc., Pharr (N)
7692 All Star Iron Works, Mercedes (I)
7692 Acosta Welding Service, Edinburg (I)
7692 Joe Summers & Co. Inc., Mission (I)
7699 Delta Machine Company, Brownsville (N)